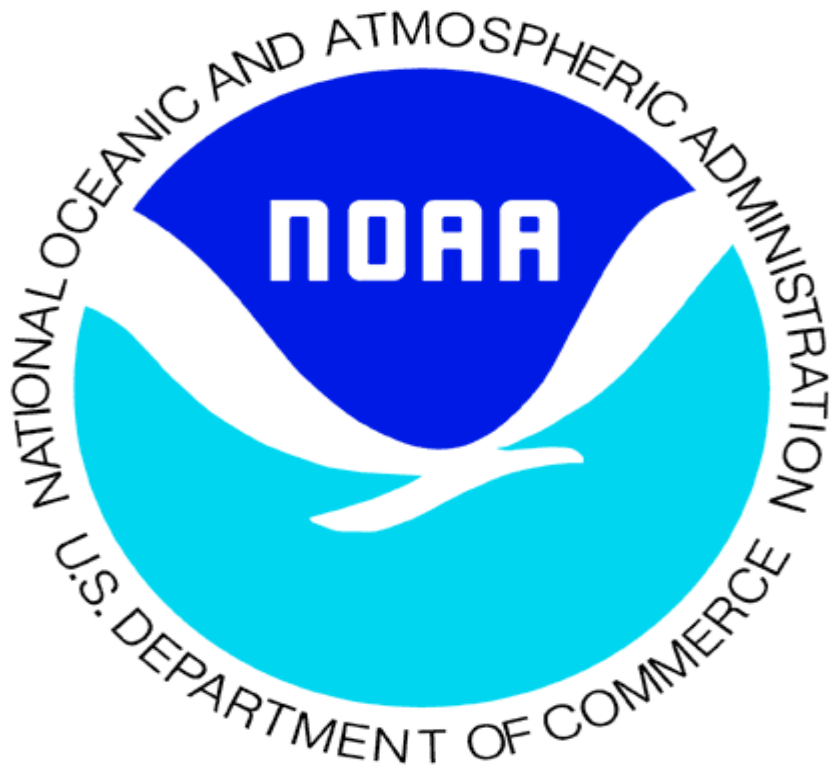


Iowa Tornado Climatology 1980-2006

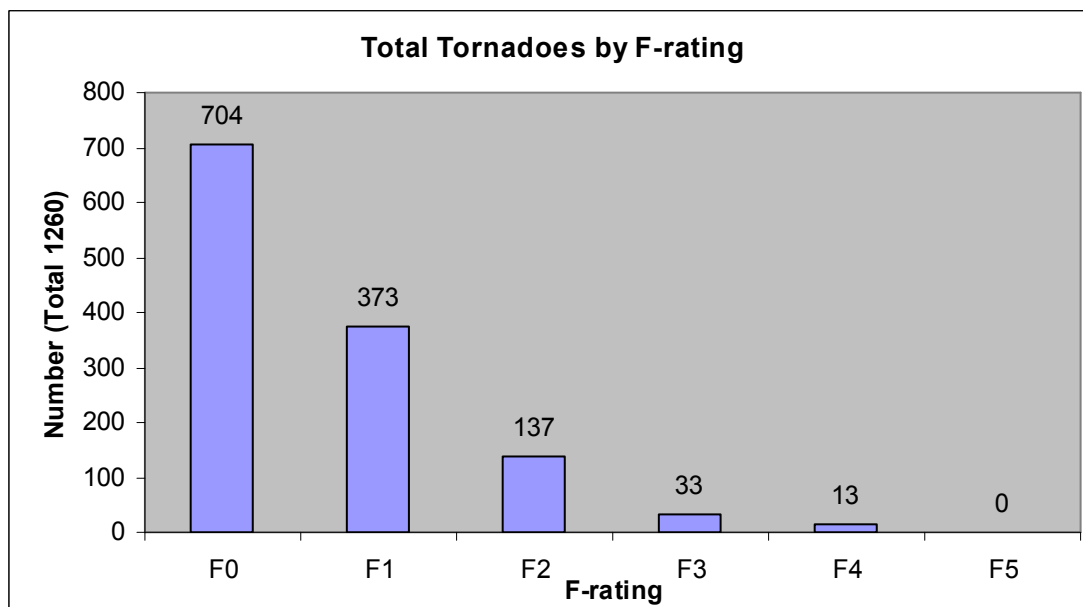


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The following data contains tornado information for the state of Iowa from 1980 through 2006. The information provided was derived from National Weather Service Storm Data reports archived at the National Climatic Data Center. The cutoff of 1980 was chosen for two particular reasons: First, reporting of tornadic events was much more sporadic prior to this time with numbers skewed heavily toward higher end events. These events tended to cause more damage, therefore attracting the attention of local authorities if not the general media as well. As a result, there was also a better chance for the stronger tornadoes to be reported to the local National Weather Service office for inclusion into Storm Data. Weak tornadoes, on the other hand, may have been observed, but due to the lack of damage and/or poor communications, the report never made it beyond the local coffee shop. Secondly, tornadoes are rated on the F-scale (Fujita scale) via a damage assessment. Prior to 1980, much of the assessment was done via newspaper articles and pictures often several years and in some instances, decades after the event. Although much information can be gleaned from these articles and pictures, a good F-scale assessment should be done as quickly as possible after the event and if possible, at the location of the event. This is not an attempt to minimize events prior to 1980, since many significant events occurred prior to this time (e.g. Jordon Tornado, Charles City Tornado, etc...). However, from a climatological perspective, it was felt that the better assessment and reporting procedures of the last 27 years would be used to build the database.

Totals Data

The total number of tornadoes for the 27 year period in Iowa was 1260. The first of the subsequent two charts gives an F-scale breakdown of these tornadoes while the second chart provides the actual F-scale with associated wind speeds and approximate damage.



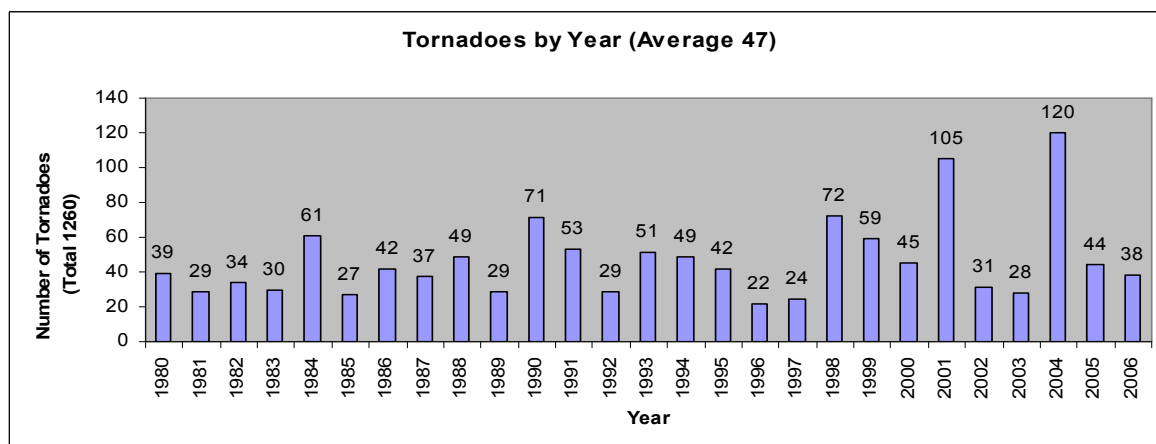
FUJITA SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	EF Number	3 Second Gust (mph)
0	40-72	0	65-85
1	73-112	1	86-110
2	113-157	2	111-135
3	158-207	3	136-165
4	208-260	4	166-200
5	261-318	5	Over 200

What is obvious from the first chart is that a very large majority (85%) of the tornadoes are on the low end of the scale (F0, F1). The remaining 15 percent of tornadoes were rated F2 through F4 with no F5's in Iowa since 1980. In fact, the last F5 to occur in Iowa was the Jordan tornado, which occurred in Boone and Story counties on June 13th, 1976.

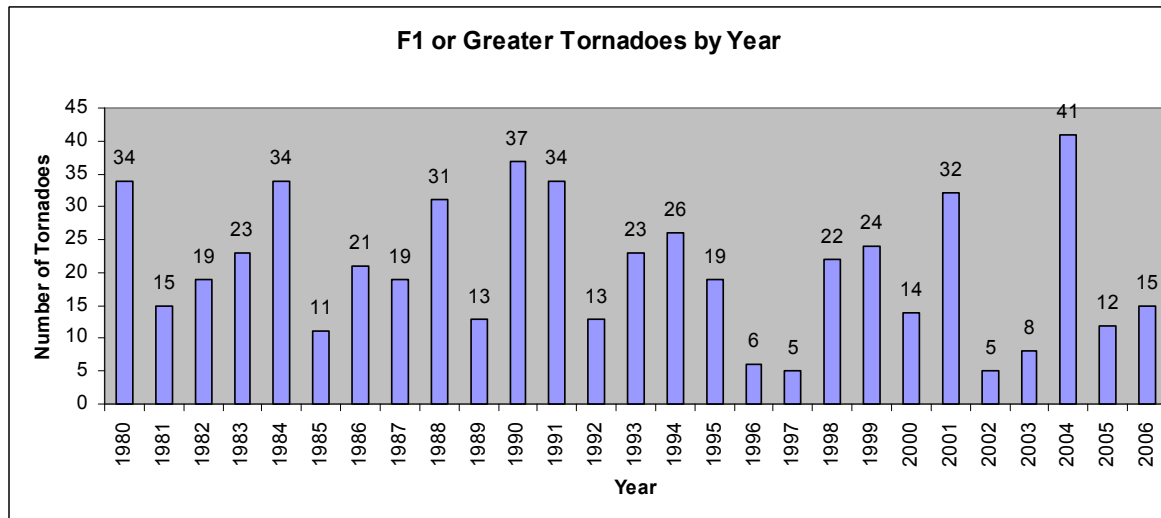
I have included the original F-scale chart used up through Jan 31, 2007. All ratings starting Feb 1st, 2007 will use the new F-scale. *The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage.* Its uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators. These estimates vary with height and exposure.

Yearly Data

Next we will look at the number of tornadoes by year. Since 1980, there have been on average, 47 tornadoes per year in Iowa. However, the variation from year to year can be great as evident between the years of 2003 and 2004 that had 28 and 120 tornadoes respectively.

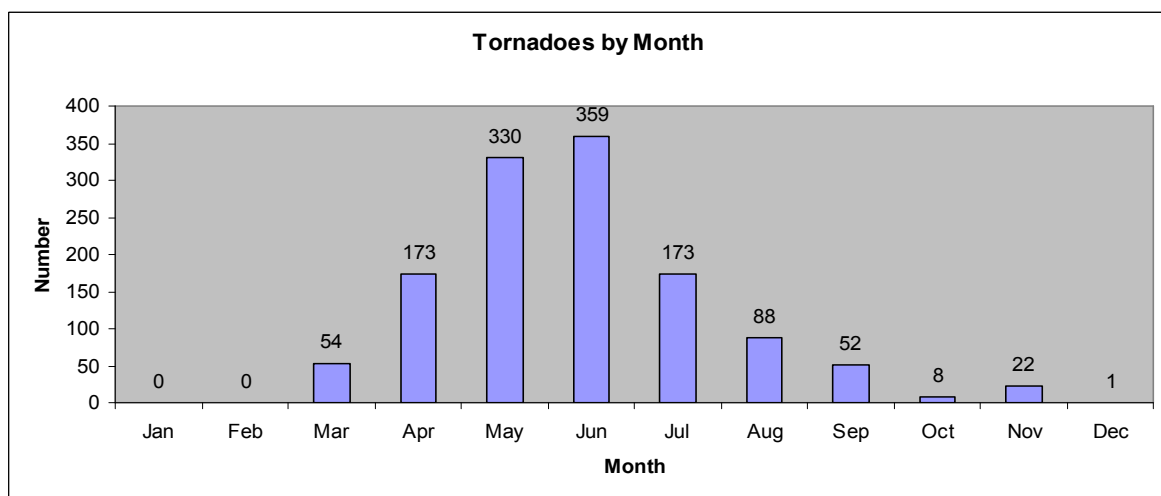


Of note on the above graph, Iowa has broken the yearly record for the number of tornadoes in 1998, 2001 and again in 2004. However, when taking out the F0's from the data and plotting the number of tornadoes (graph below), we see that the number of F1's to F5's have been relatively flat over the last 27 years. It becomes obvious that most of the increase in tornado numbers over the period have come from the better reporting of F0 tornadoes.



Monthly Data

Breaking the data down into monthly periods (graph below), we see that May and June are about equal in the number of tornadoes. These two months have prime conditions for tornadoes including warm temperatures, ample moisture, and relatively strong winds at different levels in the atmosphere. However, it should be noted that tornadoes do occur in every month of the year in Iowa. The data here only reflects tornadoes since 1980 with tornadoes having been reported in January and February prior to the study period.

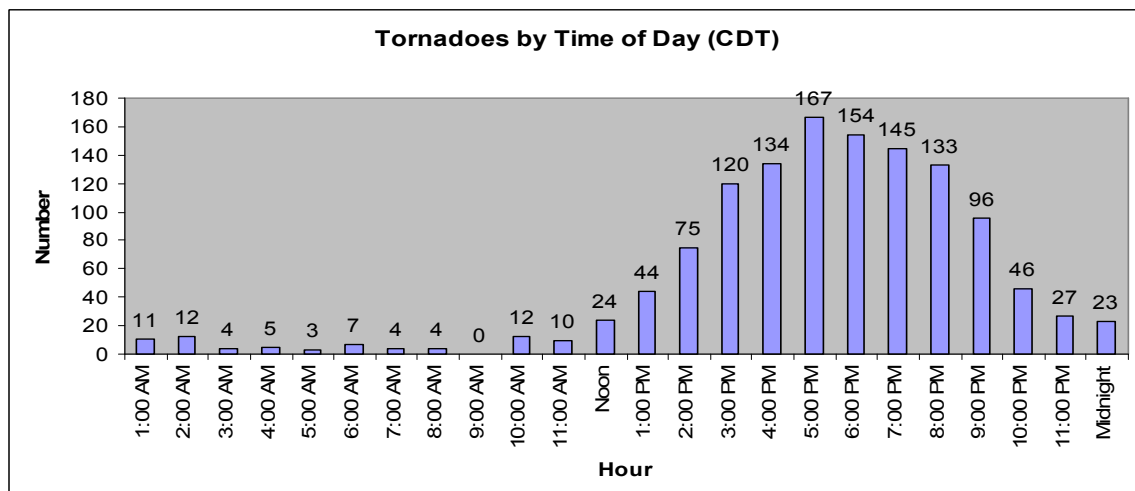


The rankings below provide the most tornadoes recorded in a one month period. May and June are heavily represented with a smattering of other months. April 2006 was added to the list this year with a very active month, especially the 13th.

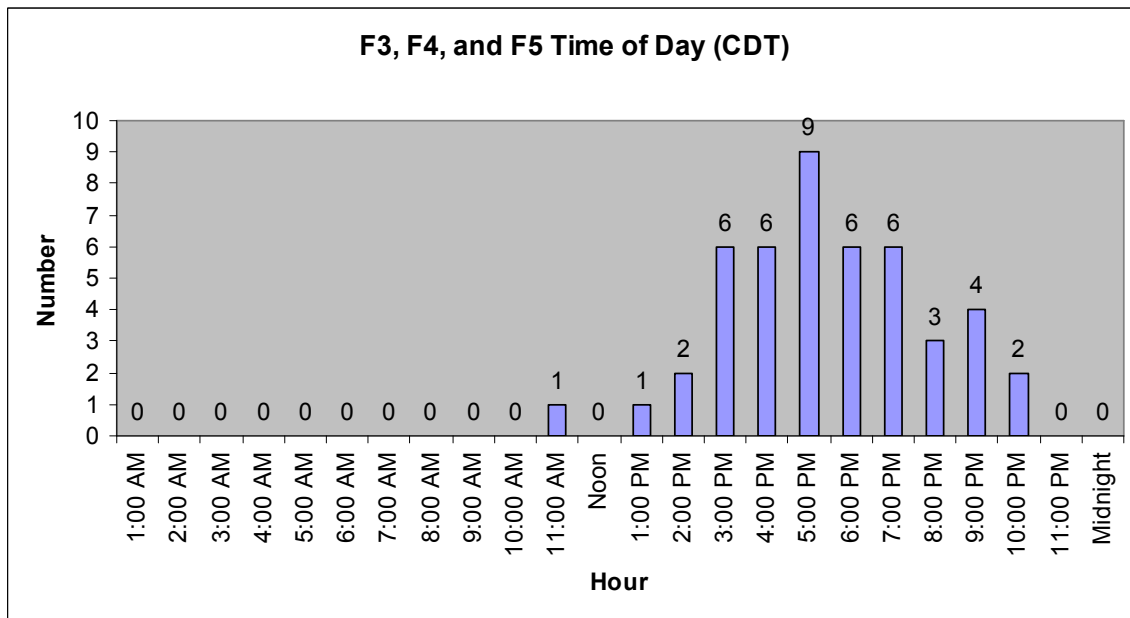
Rank	Date	Tornadoes	Rank	Date	Tornadoes
1.	May 2004	57	11.	May 2000	24
2.	June 1984	48	12.	April 2006	23
3.	April 2001	40	13.	May 1995	22
4.	June 1990	36	14.	June 1994	20
5.	May 1998	34	15.	July 1994	19
	June 2001	34		April 1999	19
7.	June 2004	28		June 1999	19
8.	June 1993	26	18.	July 1993	18
9.	May 1988	25	19.	May 1982	17
	June 1998	25		March 1990	17

Daily Data

As with certain months being more favorable than others for tornadoes, the same applies to the time of day. From the chart below, it is easy to see that from mid afternoon until around sunset, there is a peak in activity. Tornadoes need plenty of energy in the atmosphere to develop and maintain their structure. The sun warms up the atmosphere and the peak temperatures of the day often occur by mid afternoon. This warmth, combined with moisture in the atmosphere provides much of the energy needed to produce tornadoes (although other factors are also necessary). They are able to feed off this energy fairly efficiently until sunset when the surface temperatures begin to cool more quickly. The cooling decreases the energy in the lower atmosphere and therefore tornadoes have a more difficult time developing, especially for much of the AM hours. However, note that this is not always the case as tornadoes can occur at any time during the day or night given the right conditions. The time of day given to a tornado is the time the tornado first “touched” the ground even if the tornado crossed over into a subsequent hour. In addition, a given time such as 5:00 PM includes all times between 5:00-5:59 PM.



Notice that the more intense tornadoes (below chart), occur primarily with the heat of the day. None have occurred in the 12 hour period from 11 PM to 10 AM CDT.



Another rankings list is provided giving the most tornadoes on an individual day. Again May and June have the most but some big events have also occurred in April.

Rank	Date	Tornadoes	Rank	Date	Tornadoes
1.	April 11, 2001	28		May 16, 1999	13
2.	June 11, 2004	24	12.	March 22, 1991	12
3.	May 8, 1988	22		June 29, 1993	12
4.	June 7, 1984	21		May 9, 1995	12
5.	May 22, 2004	20		May 10, 2001	12
6.	June 1, 2001	18		Nov. 12, 2005	12
7.	April 8, 1999	16		April 13, 2006	12
8.	May 21, 2004	16	18.	June 16, 1990	11
9.	March 13, 1990	14		September 5, 2004	11
10.	May 15, 1998	13			

Injuries and Deaths

Since 1980, there have been 593 injuries and 13 deaths attributable to tornadoes. The following is a breakdown of each by year. No trend is evident in the data.

Year	Injuries	Deaths	Year	Injuries	Deaths
1980	8	0	1993	9	0
1981	12	0	1994	1	0
1982	1	0	1995	3	0
1983	35	0	1996	2	0
1984	100	3	1997	0	0
1985	30	2	1998	133	0
1986	8	1	1999	28	2
1987	0	0	2000	26	1
1988	92	0	2001	12	2
1989	9	0	2002	0	0
1990	16	0	2003	0	0
1991	4	0	2004	15	0
1992	3	0	2005	14	1
			2006	32	1

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